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REMARKS

The rejections under 35 U.S.C. § 103(a) as unpatentable of:

Claims 1-5 and 7-11 over U.S. 4,503,115 (Hemels et al) in view of U.S. 4,595,394 (Okamoto et al), and

Claim 6 over Hemels et al in view of Okamoto et al, and further in view of U.S. 5,435,954 (Wold),

are respectfully traversed.

This invention relates to resin compositions each of which, when molded, gives an external appearance resembling nonwoven fabric (nonwoven-fabric-like external appearance) to a surface of the resulting molded product, and more specifically to resin compositions each of which is excellent in weatherability and heat discoloration resistance, has stable mechanical properties and, when molded using molds having fine rugged patterns on surfaces thereof, gives various nonwoven-fabric-like color tones and external appearances, which are rich in warmth and depth, to surfaces of the resulting molded products.

As described in the specification under "Description of the Related Art," beginning at page 1, line 17, there have been attempts to impart a non-woven fabric-like external appearance to a surface of a molded plastic product, but they are problematical. A variety of resin compositions with colored short fibers have been marketed, but except for some applications, molded products of these resin compositions have surfaces poor in durability such as heat resistance and weatherability. As colored short cellulosic fibers undergo neither melting nor softening and shrinkage, even when heated, they are useful as colored short fibers for resin compositions, but they too are accompanied by drawbacks, such as being poor in heat discoloration resistance, so that the fibers themselves undergo yellowing or browning at a molding temperature as low as 220°C or so. Cellulosic short fibers dyed with general-purpose dyes are not sufficient in both heat discoloration resistance and weatherability. Resin

compositions which contain colored short cellulosic fibers mass-colored with a pigment are themselves problematical for reasons described.

The present invention addresses the above-discussed problems of the prior art. As claimed in Claim 1, the invention is a resin composition comprising a matrix resin and short cellulosic fibers dyed with at least one threne dye.

The resin of Claim 1, when used as a master batch, as claimed in Claim 5, when mixed with an uncolored resin free of dyed short cellulosic fibers, form a molding resin composition, as claimed in Claim 9, that can be molded to form a molded product with a surface having an external appearance resembling non-woven fabric, as claimed in Claim 11.

The applied prior art neither discloses nor suggests any of the presently-claimed inventions.

Hemels et al discloses a decorative, plate-shaped molded article consisting of a core of a fiber-containing material, coated with a thermosetting synthetic resin, which is then heat-hardened and pressed, and finally a decorative layer is applied to the surface or surfaces of the core (column 1, lines 6-11). Hemels et al discloses preparing their article by coating the wood or cellulose fibers with the thermosetting synthetic resin in an uncured state, forming the coated fibers onto a randomly deposited non-woven web-like mat, pre-densifying the web-like mat, and heating and pressing the pre-densified mat under conditions sufficient to harden the resin (column 3, lines 37-46), followed by applying the decorative layer to the surface or surfaces of the core (column 6, line 57ff).

The Examiner finds, in effect, that Hemels et al discloses the presently-claimed invention except for the use of a threne dye. The Examiner is incorrect on many levels. While the Examiner finds that Hemels et al discloses the use of a pigment, it is only with regard to the decorative layers therein (sentence bridging columns 6 and 7). Hemels et al

neither discloses nor suggests their wood or cellulose fibers colored with any material, let alone with the presently-recited at least one threne dye.

The Examiner relies on Okamoto et al for a disclosure of dyeing cellulose fibers with threne dyes. However, Okamoto et al does not add anything to what Applicants have already acknowledged, i.e., that threne dyes have been used to dye cellulosic fibers. See the specification at the sentence bridging pages 8 and 9. However, without the present disclosure as a guide, there would have been no motivation to combine Hemels et al and Okamoto et al. Indeed, since the core of Hemels et al is covered by a decorative layer, what incentive could there possibly be to dye the wood or cellulose fibers of Hemels et al's core? Obviously, there would be no reason for one skilled in the art to do so.

Wold has been relied on for a disclosure of plastics such as polyethylene, polypropylene, and polyvinyl chloride in articles comprising reinforced composite materials including primarily wood or cellulosic fibers and a plastic. However, one skilled in the art would not have combined Wold with Hemels et al and Okamoto et al. Hemels et al requires a **thermosetting** resin. Plastics such as polyethylene, polypropylene, and polyvinyl chloride are generally thermoplastic resins. It is clear that one of ordinary skill in the art would not replace a resin, required to be thermosetting, with a thermoplastic resin. Moreover, even if one skilled in the art replaced the thermosetting resin of Hemels et al (modified by Okamoto et al) with any of the resins of Wold, the result would still not be the presently-claimed invention.

Claim 8 is separately patentable herein in view of the comparative data in the specification, which shows that when the concentration of the threne dye is from 7 to 15 wt.% based on the short cellulosic fibers, various improved properties result. See Examples 1-4, and the corresponding comparative examples designated as Reference Examples 1-4, respectively, described in the specification beginning at page 19, line 18. The prior art does

not appreciate that the amount of threne dye based on the short cellulosic fibers, is a result-effective variable.

For all the above reasons, it is respectfully requested that the rejection over prior art be withdrawn.

The rejection of Claim 7 under 35 U.S.C. § 112, second paragraph, as containing trademarks is respectfully traversed. As is well-known, the designations in Claim 7 refer to well-established *Colour Index* names, each of which is directly tied to a particular, known azo dye. **Submitted herewith** is a copy from Kirk-Othmer, *Encyclopedia of Chemical Technology*, 4th ed., 3:821 (1997), which explains the *Colour Index*, and 23:354 (1992), which exemplifies a number of Vat Dyes, which shows that the presently-recited nomenclature is consistent with *Colour Index* nomenclature. Thus, there is no question of indefiniteness herein. Accordingly, it is respectfully requested that this rejection be withdrawn.

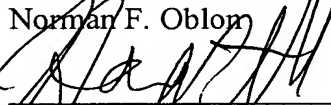
Applicants respectfully call the Examiner's attention to the Information Disclosure Statement (IDS) **submitted herewith**. The Examiner is respectfully requested to initial the Form PTO-1449 submitted therewith, and include a copy thereof with the next Office communication.

Application No. 10/067,944
Reply to Office Action of March 31, 2004

All of the presently-pending claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.
Norman F. Oblon



Harris A. Pitlick
Registration No. 38,779

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/03)
NFO/HAP/cja

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FOURTH EDITION

VOLUME 3

ANTIBIOTICS
TO
BATTERIES

1992



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AZO DYES

The term azo dyes is applied to those synthetic organic colorants that are characterized by the presence of the chromophoric azo group ($-N=N-$). This divalent group is attached to sp^2 hybridized carbon atoms: on one side, to an aromatic or heterocyclic nucleus; on the other, it may be linked to an unsaturated molecule of the carbocyclic, heterocyclic, or aliphatic type. No natural dyes contain this chromophore. Commercially, the azo dyes are the largest and most versatile class of organic dyestuffs. There are more than 10,000 Colour Index (CI) generic names assigned to commercial colorants, approximately 4500 are in use and over 50% of these belong to the azo class (1). U.S. dye manufacturers produced 127,000 t of dyes in 1988, valued at \$766 million, which is still 4% less in terms of value than in 1980. In terms of quantity, sales of dyes in 1988 were about 14% higher than in 1980. Synthetic dyes are derived in whole or in part from cyclic intermediates. Approximately two-thirds of the dyes consumed in the United States are used by the textile industry to dye natural and synthetic fiber or fabrics, about one-sixth is used for coloring paper, and the rest is used chiefly in the production of organic pigments and in the dyeing of leather and plastic. Dyes are sold as pastes, powders, and liquids; concentrations vary from 6 to 100%. The concentration, form, and purity of a dye is determined largely by the use for which it is intended.

Classification and Designations. The most authoritative compilation covering the constitution, properties, preparations, manufacturers, and other coloring data is the publication *Colour Index*, which is edited jointly by the Society of Dyers and Colourists and the American Association of Textile Chemists and Colorists (AATCC). In the *Colour Index* a dual classification system is employed to group dyes according to area of usage and chemical constitution. Because of the ease of synthesis of azo, disazo, and polyazo dyes, and their wide range of applications, azo dyes comprise the largest chemical class in numbers, monetary value, and tonnage produced. There are more than 2200 chemical structures of azo dyes disclosed in the *Colour Index* (Vols. 4-8).

Nearly all dye manufacturers use letters and numerals in the names of their products to define the hue. Thus B is blue; G, yellow (gelb in German) or green; R, red; and Y, yellow. Numerals, ie, 2G (or GG), 3G, 4G, etc indicate, in this case, a successively yellower or greener shade. Occasionally, suffixed letters are used to feature other properties such as solubility, lightfastness, brightness, and use on synthetic fibers.

Chemically, the azo class is subdivided according to the number of azo groups present into mono-, dis-, tris-, tetrakis-, etc. Mono- and disazo dyes are essentially equal in importance, trisazo dyes are less important, and tetrakisazo dyes, except for a few, are much less important. For this reason, substances with more than three azo linkages are generally included under the heading of polyazo dyes. The *Colour Index* lists the azo dyes as follows:

Chemical Class	Colour Index Number Range
monoazo	11,000-19,999
disazo	20,000-29,999
trisazo	30,000-34,999
polyazo	35,000-36,999

KIRK-OTHMER

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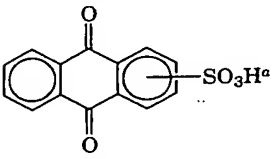
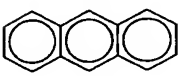
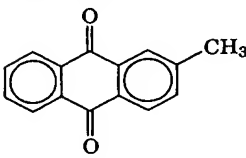
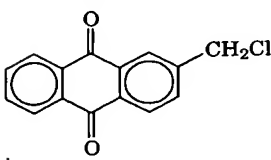
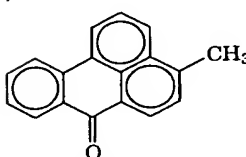
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Sugar
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Sulfola
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Sulfoxi
Sulfur
Sulfur
Sulfur
Sulfur
Sulfuric
Sulfuric
Sulfuric
Sulfu
Sulfur
Superc
Surfact
Suture
Sweete
Syrups

Table 5. Sulfurized Vat Dyes

Intermediate	Shade	CI designation		CAS Registry Number
		Name	Number	
	yellowish brown	Vat dye	58820	[1328-11-6]
	olive	Vat Green 7	58825	[1328-12-7]
	yellowish orange	Vat Orange 21	69700	[1328-39-8]
	yellow	Vat Yellow 21	69705	[1328-40-1]
	dull greenish blue green	Vat Blue 7 Vat dye	70305 70310	[6505-58-4]

^aMono or di.

solvent after first distilling off any water contained in the raw materials. In order to keep the melt fluid, hydrotropic substances such as urea, thiourea, or xylene sulfonates are added. Hydrotropic substances shorten thionation time and increase yield and brightness.

Metallic additions to the melt, usually in the form of copper sulfate, brighten the shade of certain dyes, such as the Bordeaux range made from phenazones and the greens made from the indophenols; the metal forms a complex with the dye. However, copper-containing dyes cannot be applied to material that requires vulcanization.

The composition of the polysulfide varies. It is generally applied in excess with the result that the final dye is wholly or partly in solution in leuco form. At this stage, it can be converted to a liquid form by suitable dilution and the addition of sodium hydrosulfide or diluted, if necessary filtered, and then precipitated by blowing air through the liquor or adding dilute acid. When stronger dyes are required, precipitation may be carried out by adding sodium nitrite directly to the final melt. The excess polysulfide is oxidized and ammonia liberated. Air blowing is usually continued in order to obtain the required brightness of shade. In some cases, caustic soda is added to partly dissolve the dye and air blowing